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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09/882,351	06/15/2001	Won-Il Jung	45323 DBP Y35	8658

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EXAMINER
BLANTON, REBECCA A

ART UNIT	PAPER NUMBER
1762	5

DATE MAILED: 05/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Application No.	Applicant(s)
09/882,351	JUNG, WON-IL
Examiner	**Art Unit**
Rebecca A. Blanton	1762

Office Action Summary

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 04/13/01 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4)☐ Interview Summary (PTO-413) Paper No(s). _____
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-4, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koksbang et al. (U.S. 5,368,959) in view of Kinard et al. (U.S. 5,888,582).

Koksbang et al. discloses a lithium metal oxide cathode that is coated with a current collector (abstract). The cathode, taught by Koksbang et al., is a Li-Mn-O-based cathode (column 3 line 5). In column 3 lines 15-19, Koksbang et al. teach that the cathode has a current collector of a conductive polymer coating, where the conductive polymer may be polyaniline. Koksbang et al. do not teach how to apply the polyaniline coating on to the lithium complex oxide cathode. Kinard et al. disclose a method of forming polyaniline films and coatings with a solvent (abstract). The polyaniline films, taught by Kinard et al., are used to form conductive articles, such as batteries (column 2

lines 1-3). Kinard et al. teach that the polyaniline is dissolved into a solvent forming a composition into which the substrate is placed; the coating composition is then dried to remove the solvent forming a polyaniline coating (column 1 lines 48-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to coat the cathode with polyaniline, taught by Koksbang et al., by dissolving the polyaniline into a solvent, coating the substrate, and then drying the coating to form a film, as taught by Kinard et al., in the absence of Koksbang et al. teaching a method of forming the polyaniline film on the substrate.

Regarding claim 4, in column 4 lines 24-34, Koksbang et al. teach that the polyaniline is doped by contacting it with an acid.

Referring to claim 12, Koksbang et al. teach that the thickness should be a few microns to 50 microns (column 3 lines 25-26).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koksbang et al. (U.S. 5,368,959) in view of Kinard et al. (U.S. 5,888,582) as applied to claim 1 above and in further view of Thometzek et al. (U.S. 5,589,222).

Koksbang et al. disclose a lithium complex oxide cathode that is coated with a polyaniline film, as described above. Kinard et al. disclose a process for forming a coating of polyaniline film, also disclosed above. However, neither reference discloses how to apply the coating to the metal oxide substrate. Thometzek et al. disclose a process for coating particles with a polymer (abstract). The powders to be coated include metal oxides, as disclosed by Thometzek et al. in column 2 lines 14-20. In column 3 lines 30-34, the reference teaches that forming a suspension of the powder

with the polymer in a spray dryer to coat the pellets. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a spray dryer to apply the polyaniline coating to the cathode, as taught by Koksbang et al., using the coating composition taught by Kinard et al., in view of the teachings of Thometzek et al. of using a spray dryer to apply a polymeric coating to a metal oxide, in the absence of Koksbang et al. and Kinard et al. disclosing methods for applying the coating to the metal oxide particles.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koksbang et al. (U.S. 5,368,959) in view of Kinard et al. (U.S. 5,888,582) as applied to claim 1 above and in further view of Takashashi et al. (U.S. 5,679,480).

Koksbang et al. teach coating a lithium complex oxide cathode with a polyaniline film, as described above. Additionally, Koksbang et al. teach that the cathode material is a Li-Mn-O-based material. Kinard et al. disclose a process for forming a coating of conductive polyaniline film, also disclosed above. Neither reference teaches the exact cathode materials. Takashashi et al. teach that a cathode of a secondary battery may be $LiMnO_2$ or $LiMn_2O_4$ (column 5 lines 7-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to look to prior art for an appropriate cathode material based on the teaches of Koksbang et al. that the cathode material is a Li-Mn-O-based material, and to use $LiMnO_2$ or $LiMn_2O_4$ in view of the teachings of Takashashi et al. that these are appropriate cathodic materials.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koksbang et al. (U.S. 5,368,959) in view of Kinard et al. (U.S. 5,888,582) as applied to claim 1 above and in further view of Tasaka et al. (U.S. 6,280,854).

Koksbang et al. teach coating a lithium complex oxide cathode with a polyaniline film, as described above. Kinard et al. disclose a process for forming a coating of conductive polyaniline film, also disclosed above. However, neither reference discloses the addition of a conductive agent in the conductive coating. Tasaka et al. disclose an electrode for a secondary battery (abstract). The electrode, taught by Tasaka et al., is formed of a polyaniline, a binder, and a conducting agent (column 2 lines 20-27). Tasaka et al. teach that the conducting agent has the effect of improving the electron conductivity in the electrode composition material (column 5 lines 18-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a conductive agent into the polyaniline coating on a secondary battery cathode, as taught by Koksbang et al., in view of the teachings of Tasaka et al. that a conductive agent on a secondary battery cathode improves the electron conductivity in the electrode composition material.

Claims 6-7, and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koksbang et al. (U.S. 5,368,959) in view of Kinard et al. (U.S. 5,888,582) and in further view of Tasaka et al. (U.S. 6,280,854) as applied to claim 5 above and in further view of Takei et al. (U.S. 6,337,155).

Koksbang et al. teach coating a lithium complex oxide cathode with a polyaniline film, as described above. Kinard et al. disclose a process for forming a coating of

conductive polyaniline film, also disclosed above. Tasaka et al. teaches the use of a conductive agent in a secondary battery cathode, also disclosed above. However, none of the previous references teaches that addition of an ionic conductive polymer in the coating. Takei et al. disclose a secondary battery that has a cathode consisting of mainly a metal oxide alkali metal and an electrically conductive material (abstract). Takei et al. teach that the cathode may be lithium manganate with polyaniline as the conductive polymer material (column 4 lines 5-21). In column 6 lines 19-22, Takei et al. teach that polyethylene oxide can be used as the polymeric electrolyte in the battery. Furthermore, in column 7 lines 38-43, Takei et al. teach that the conductive polymer and polymeric electrolyte are dissolved in the same coating composition, which forms a coating on the surface of the metal oxide particle. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the polymeric electrolyte into the polyaniline coating on the cathode material, as taught by Koksbang et al., in view of the teachings of Tasaka et al. of including the polymeric electrolyte into the coating on the metal oxide cathodic materials, in the absence of a teaching of Koksbang et al. as to the electrolyte.

Regarding claims 10 and 11, Koksbang et al. do not disclose the amount of coated conductive polymer on the surface of the cathode. However, Takei et al. teach that the film layer should have a structure, which partially exposes the metal oxide (column 6 lines 50-53). The amount of coating is a known result effective variable. If the amount of coating is too high the metal oxide particles will be completely coated, however, if the amount of coating is too low, there will not be a sufficient amount of

conductive polymer to act as a current collector. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the optimum amount of conductive polymer coating on the metal oxide, as taught by Koksbang et al., in the absence of unexpected results, in view of the teachings of Takei et al. that some of the metal oxide surface should be exposed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca A. Blanton whose telephone number is 703-605-4295. The examiner can normally be reached on M - F (7:30am - 3:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on 703-308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

rab RAB
May 3, 2002

MICHAEL BARR
PRIMARY EXAMINER